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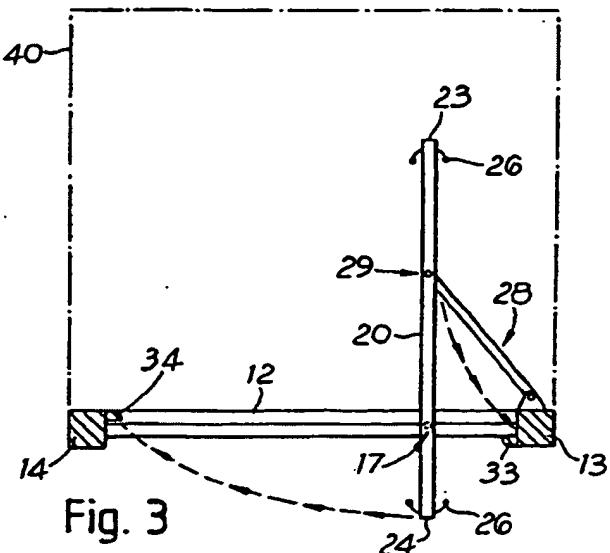
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## (54) Door assembly, particularly for shower enclosures

(57) Pivotal connection elements (17), which are arranged at the top and bottom of the door (20) for pivotally mounting said door in a doorway and which are themselves slidable along guide means in the doorway, are offset inwardly from one side edge (24) of the door, preferably by about one quarter to one half the width of the door, or by 5 to 20 cm. In this way, much of the weight of the door (20) is borne by the doorway and pivotal arms (28), which connect top and bottom corners of the doorway to locations at the top and bottom of the door intermediate the pivotal connections and the other side edge (24), serve mainly for support and can be relatively flexible and lightweight.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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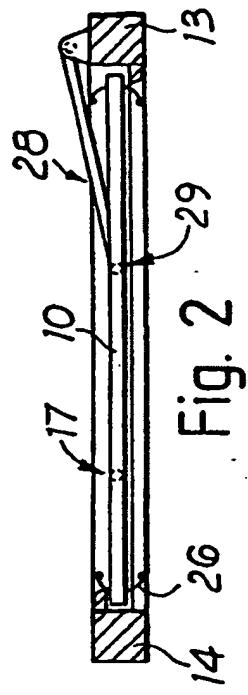


Fig. 2

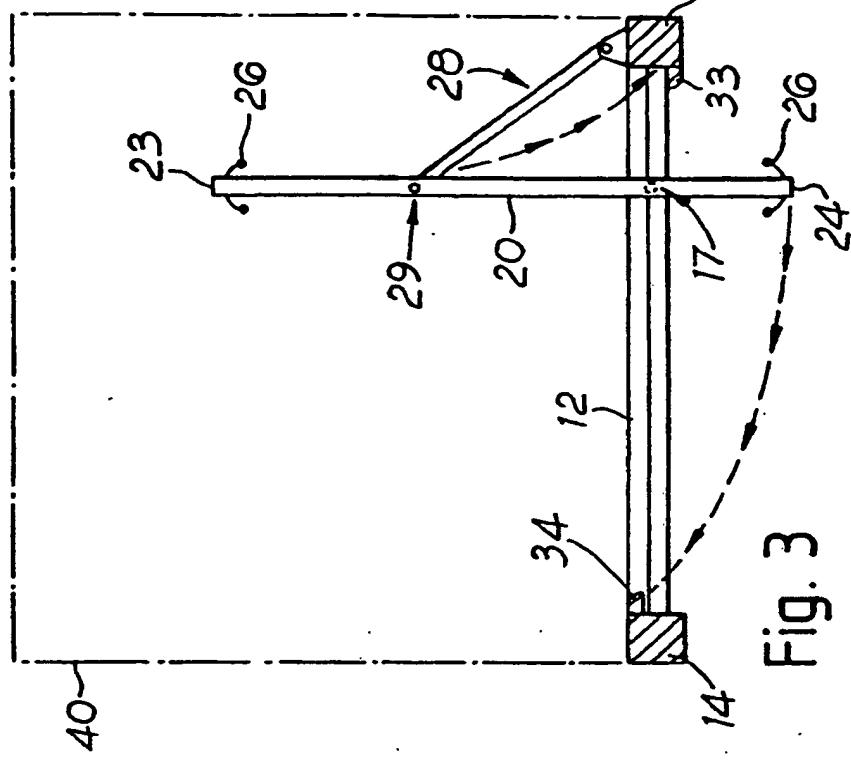


Fig. 3

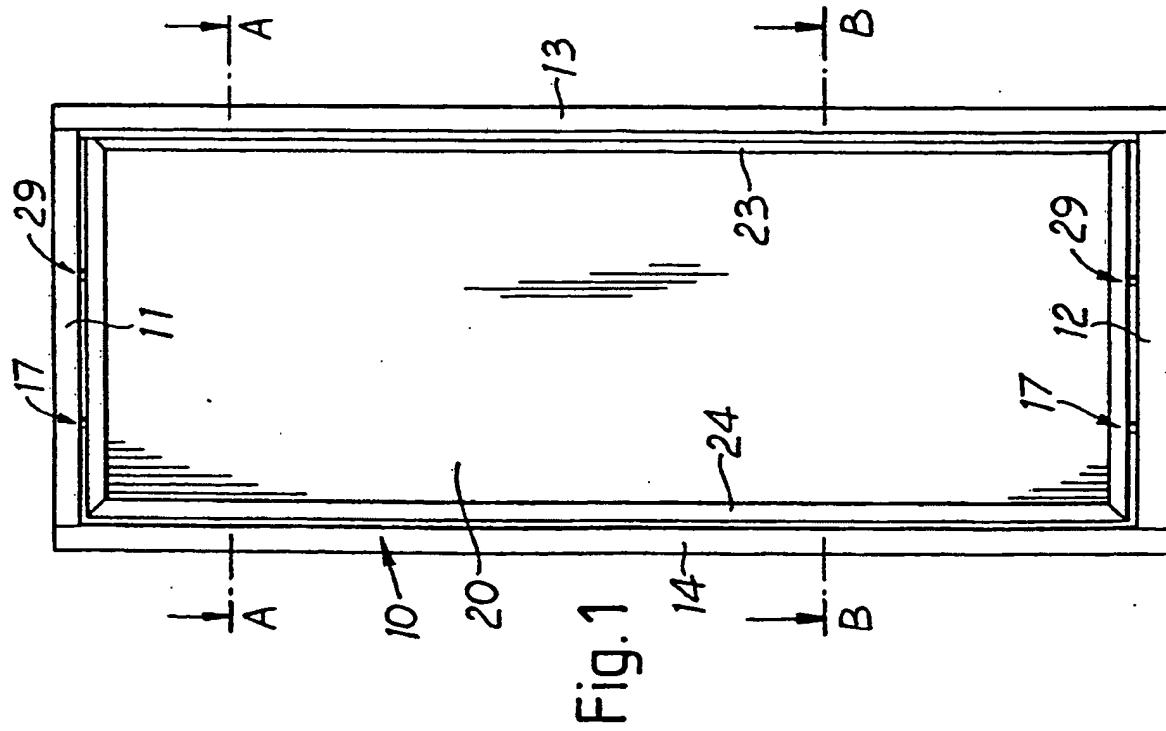


Fig. 1

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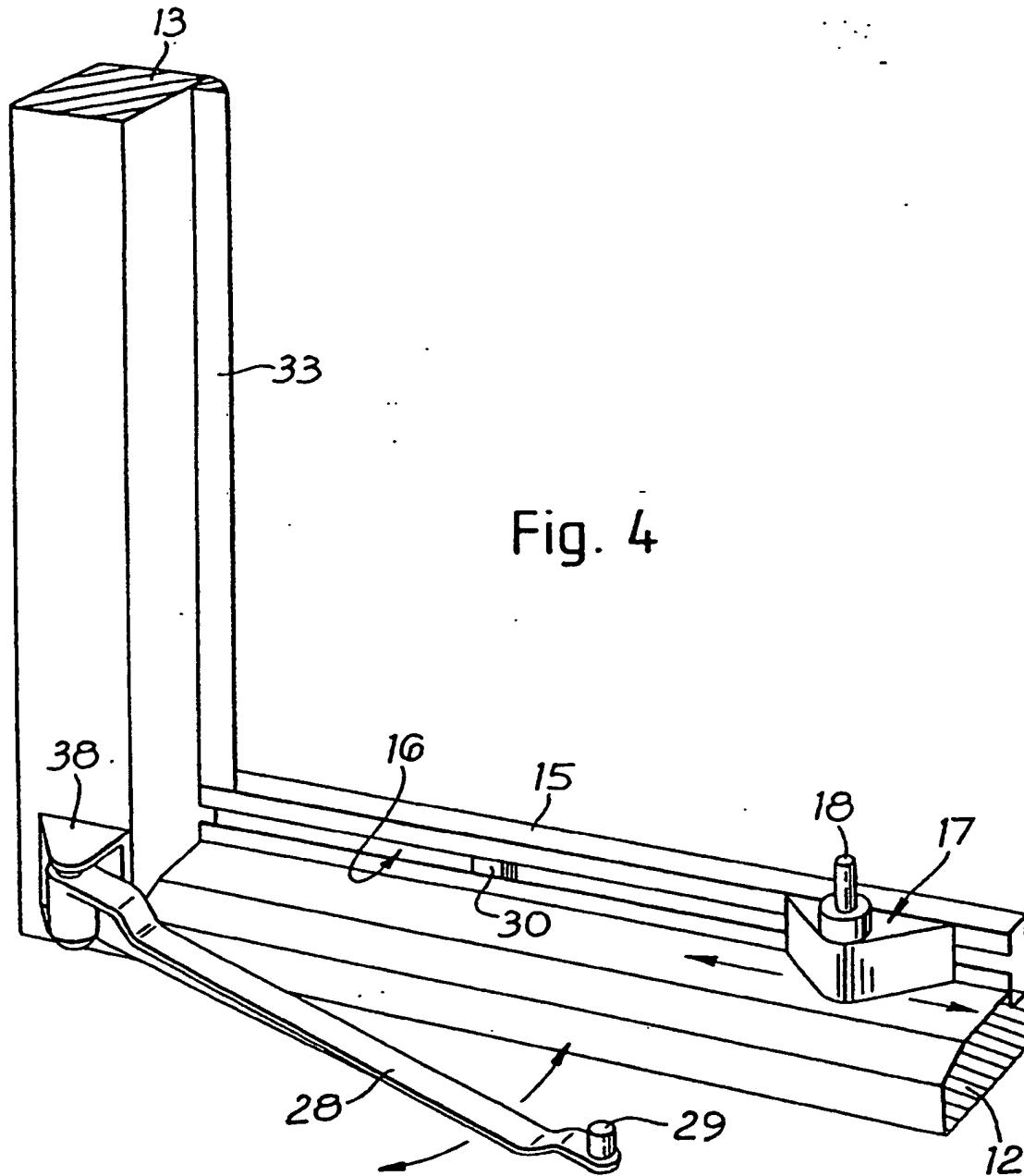


Fig. 4

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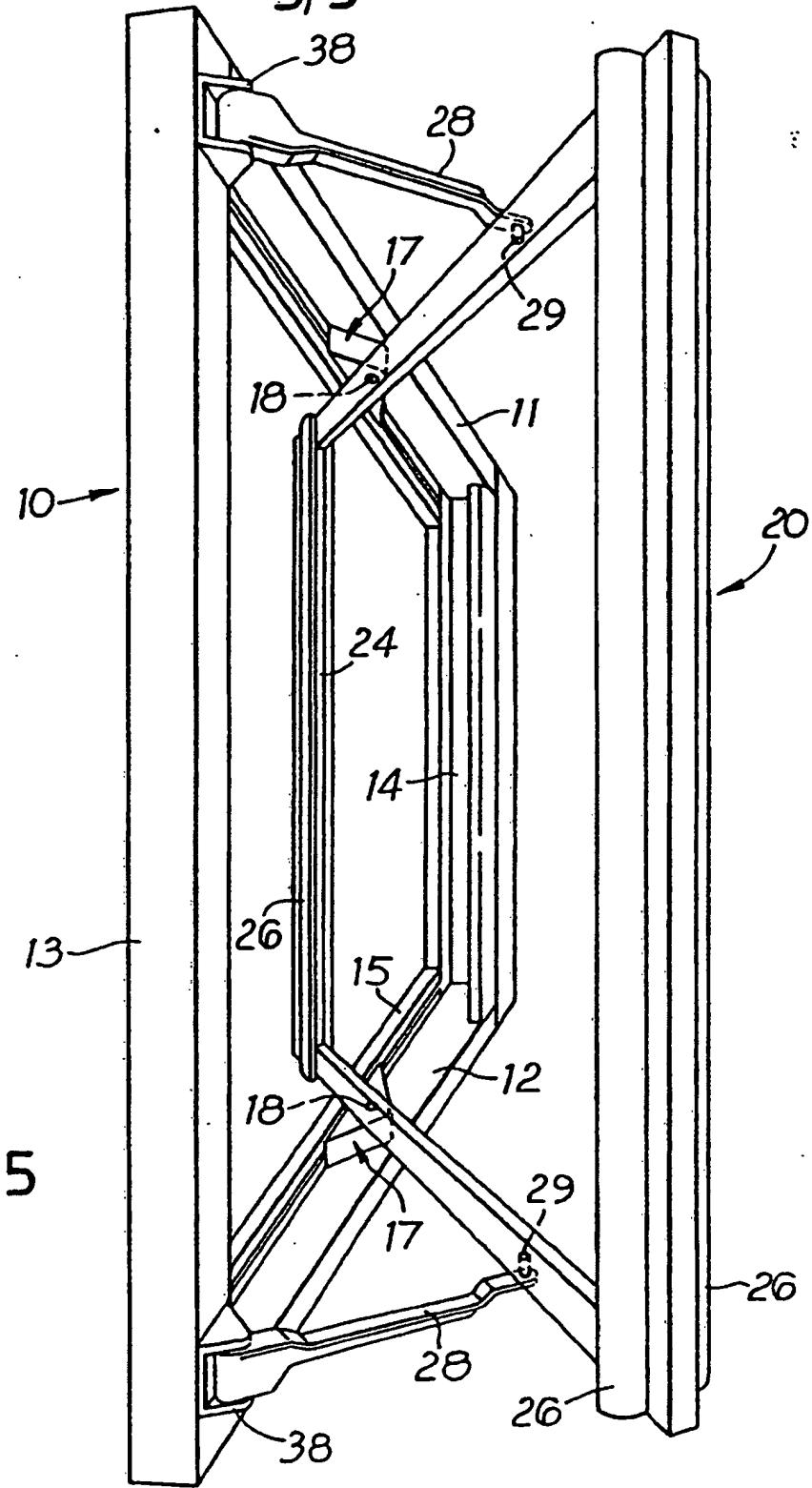


Fig. 5

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DOOR ASSEMBLY, PARTICULARLY FOR SHOWER ENCLOSURE

This invention concerns a door assembly which is particularly, but not exclusively, suited for use on a shower enclosure or cabinet.

A conventional door, hinged at one side edge, is often not suitable for a shower enclosure since if it opens outwards (and there is not room for this in some locations) water dripping onto the outside floor may be a problem, and if it opens inwards it may prove difficult for a user to enter the enclosure. For these reasons sliding or concertina-like doors are often used for shower enclosures.

A special inwardly opening door arrangement has also been proposed wherein the mid-points of the top and bottom of the door are pivotally connected to hinge arms and the extreme outer edge of the door is slidably guided along the top and bottom of the doorway. As the door is opened the inner edge of the door moves along a side of the cabinet adjacent to the doorway and may, in some cases, be slidably guided along the side wall in a similar manner to the outer edge. Such an arrangement is described in British Patent Specification No. 1560713. With such an arrangement the entire weight of the door, as it opens, is borne by the hinge arms, which accordingly need to be of robust construction. A

particular disadvantage of this construction is the risk of injury to a user (especially a child) if a foot, for example, should be trapped between the lower hinge arm and base of the door as the door is opened or between either of these and the base of the doorway as the door is closed. A further drawback in relation to modern shower cabinet design is that the path of movement of the inner edge of the door does not allow room for fitment of additional shower heads or other accessories, such as soap dishes, along that side wall of the cabinet.

It is an object of the present invention to provide an improved construction of door assembly in which the aforesaid disadvantages are minimised.

The present invention provides an assembly comprising a frame defining a doorway and a door for closing same, the door being pivotally mounted in the doorway by pivotal connection elements which are arranged at the top and bottom of the door offset inwardly from one side edge of the door and are slidable along guide means at the top and bottom of the doorway, and by pivotal arms which connect top and bottom corners of the doorway to locations at the top and bottom of the door intermediate the pivotal connection elements and the other side edge of the door.

integral flanges, panels, walls or other parts of an enclosure, the invention also encompasses an enclosure, more especially a shower cabinet, comprising a door for closing a doorway of the enclosure, the door being pivotally mounted in the doorway by pivotal connection elements which are arranged at the top and bottom of the door offset inwardly from one side edge of the door and are slidably along guide means at the top and bottom of the doorway, and by pivotal arms which connect top and bottom corners of the doorway to locations at the top and bottom of the door intermediate the pivotal connection elements and the other side edge of the door.

In either case, the pivotal connection elements are preferably offset from said one side edge by from 5 to 20 cm, or by about one quarter to one half of the width of the door.

With this new arrangement, with the pivotal connection elements offset from the side edge of the door, the weight of the door is borne by these elements and by the frame or other means defining the doorway, and the arms merely serve for guidance of the door during opening and closing operations. This means that the arms can be of relatively slight and simple construction and thus less costly to manufacture. Also they can be made of flexible material and can be attached to the door in such a manner as to allow them a certain degree of

movement up and down so that they will deform and/or be displaced if there is any obstruction between the door or the door frame and either of said arms upon opening or closing of the door. This minimises the risk of injury if a user inadvertently traps a foot or toe in that region.

Where there is a separate door frame, this can also be of lighter construction than with the prior arrangement since the weight of the door is borne by the frame as a whole instead of being concentrated at the fixing points of the hinge arms.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a door assembly in accordance with the present invention;

Fig. 2 is a schematic cross-section along the line A-A or B-B of Fig. 1 with the door in its closed position;

Fig. 3 is a view corresponding to Fig. 2 but showing the door in an open position as part of a cabinet;

Fig. 4 is an enlarged fragmentary perspective view showing a lower corner portion of the door frame, from the inside and with the arm detached; and

Fig. 5 is a perspective view of the entire assembly as shown in Figs. 1 to 4, illustrating the opening of the door.

As illustrated in Figs. 1 to 3, and perhaps most clearly in Fig. 5, the door assembly in accordance with the invention comprises a substantially rectangular frame 10 and a door 20 pivotally mounted within the frame 10 to open and close the doorway defined by the frame 10. In this particular embodiment the frame 10 is made of aluminium, the respective frame members 11 to 14 consisting of extruded hollow profiles. The door 20 itself consists of a patterned glass panel within a subframe, but in the drawings the panel is omitted for the sake of clarity. Each of the side subframe members 23, 24 of the door 20 are provided at both front and rear with integral longitudinal ridges 26 of arcuate cross-section, as shown in Figs. 2 and 3. These ridges 26 serve as universal door handles and are of such dimensions as to provide vertical rigidity and strength to the door.

The top and bottom members 11, 12 of the frame 10 are provided with guide means in the form of integral slotted rail portions 15, as shown in Fig. 4, the slot 16 facing inwardly of any enclosure to which the assembly is fitted. A respective pivotal connection element 17 is slidably guided in each of these slots 16. As shown in Fig. 4, each such element 17 is generally in the form of a triangular block carrying a pivot pin 18 and also a T-section extension (not shown) accommodated within the slot 16. The pivot pins 18 are received in

corresponding bores in the top and bottom of the door 20 which are offset from one side edge (24) of the door 20 by about one quarter the width of the door, or between 10 and 20 cm. Thus the door 20 is pivotal about the pins 18 and the elements 17 carrying the pins 18 are slid able across the doorway in the plane of the frame 10.

Respective hinge arms 28 connect the door 20 to one of the frame side members 13 and thus determine which way the door 20 is capable of being swung during opening and closing. As shown in Fig. 4, a stop element 30 is located in each slot 16 a few cms from that same frame side member 13 to limit the movement of the connection element 17 therealong and determine the fully open position of the door 20.

The hinge arms 28 are pivotally connected to the top and bottom, respectively, of the relevant frame side members 13, at the corners of the doorway by brackets 38, as shown in Figs. 4 and 5. The arms 28 are of simple construction, being in the form of tapering strips, with a kink at their outer end where they each carry a pin 29 for pivotal connection to the door 20. Moreover, the arms 28 are made of flexible plastics material. The pins 29 locate in bores in the top and bottom of the door 20 approximately mid-way between the location of the pivotal connection elements 17 and the

other edge of the door (i.e. the edge 23 adjacent the frame member 13 where the hinge arms 28 are attached). The pins 29 are retained in these bores so as to be capable of vertical movement without complete detachment from the door.

The side frame members 13, 14 are each provided with longitudinal ledges 33, 34 which constitute stop means, abutted by the door in its closed position. In this respect the ledge 33 on the side member 13 is towards the front or outer side of the frame 10, while the ledge 34 on the side member 14 is towards the rear or inner side of the frame 10 (see Fig. 3).

The operation of the door 20 in opening and closing is best illustrated in Figs. 2, 3 and 5.

In use, the assembly is installed at one side of an enclosure 40, to provide a door thereof, as indicated in Fig. 3. When opened from outside the enclosure 40 the outer ridge 26 on the subframe member 23 is pushed inwardly while the outer ridge 26 on the subframe member 24 is pulled across towards the other side member 13 of the frame 10. The door 20 thus pivots about the elements 17 so that the shorter portion (about one quarter the width of the door) swings outwards and the remainder inwards, while the elements 17 simultaneously slide along towards the frame member 13. The hinge arms

28 meanwhile guide the inwardly swinging portion of the door 20, to which they are attached approximately centrally. Of course, once the elements 17 come into abutment against the stop elements 30 further movement thereof in that direction is prevented.

To open the door 10 from the inside, the subframe member 23 is firstly pulled inwards and then the entire door is slid across towards the side member 13.

The door is closed by reverse motion, the side edges thereof being brought into abutment against the respective ledges 33, 34.

The path of the door edges 23, 24 upon closing is indicated in broken lines in Fig. 3 and it will be noted that the inner edge 23 (closest to where the hinge arms 28 are connected) has a relatively wide clearance from the adjacent enclosure wall. This enables fitments to be mounted on this wall, for example auxiliary shower heads in the case of a shower enclosure. In this respect, the stop elements 30 are suitably spaced from the side member 13 as to prevent the door 20, when fully opened, contacting any such fitments, thereby preventing impact damage to the door or the fitments.

The arrangement just described is favourable in many respects. On the one hand it does not require a large

clearance outside the enclosure to allow for opening of the door. On the other hand, the path of the door 20 inside the enclosure is such that it does not hinder entry into or exit from the enclosure. Since the door 20 is pivoted at a point about a quarter of its width from one edge, rather than at its edge, the weight of the door 20 is supported by the frame 10. As a result the hinge arms 28 can be light and flexible because they are only needed for guidance, not for the entire support of the door. In this respect, if there is any obstruction between one of the arms 28 and the frame 10 or the door 20, the arm 28 can deform and its pin 29 may detach from the door 20 to minimise the risk of injury to a user, or damage to the door assembly.

The invention is not, of course, limited to the exact details of the illustrated embodiment. With doors of smaller dimension, the pivot point may be only 7 cm, or even as little as 5 cm from the edge of the door. At the other extreme, the pivot point may be up to half way along the width of the door. Also, it will be appreciated that a separate door frame is not necessary as the doorway may be defined by integral panels, flanges, strips or sills provided in an enclosure, for example a shower cabinet.

**CLAIMS:**

1. A door assembly comprising a frame defining a doorway and a door for closing same, the door being pivotally mounted in the doorway by pivotal connection elements which are arranged at the top and bottom of the door offset inwardly from one side edge of the door and are slidably along guide means at the top and bottom of the doorway, and by pivotal arms which connect top and bottom corners of the doorway to locations at the top and bottom of the door intermediate the pivotal connection elements and the other side edge of the door.
2. A door assembly as claimed in claim 1 wherein the pivotal connection elements are offset from one side edge by from 5 to 20 cm.
3. A door assembly as claimed in claim 1 wherein the pivotal connection elements are offset from said one side edge by one quarter to one half of the width of the door.
4. A door assembly as claimed in claim 1, 2 or 3 wherein stop elements are located in or on the guide means to limit the opening of the door.
5. An enclosure comprising a door for closing a doorway of the enclosure, the door being pivotally

mounted in the doorway by pivotal connection elements which are arranged at the top and bottom of the door offset inwardly from one side edge of the door and are slid able along guide means at the top and bottom of the doorway, and by pivotal arms which connect top and bottom corners of the doorway to locations at the top and bottom of the door intermediate the pivotal connection elements and the other side edge of the door.

6. An enclosure as claimed in claim 4 wherein the pivotal connection elements are offset from said one side edge by from 5 to 20 cm.
7. An enclosure as claimed in claim 4 wherein the pivotal connection elements are offset from said one side edge by one quarter to one half of the width of the door.
8. An enclosure as claimed in claim 5, 6 or 7 wherein stop elements are provided in or on the guide means to limit the opening of the door.
9. A door assembly substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.